



# AFOSR OVERVIEW

**Dr. Thomas Russell, SES**

**Director**

**AFOSR**

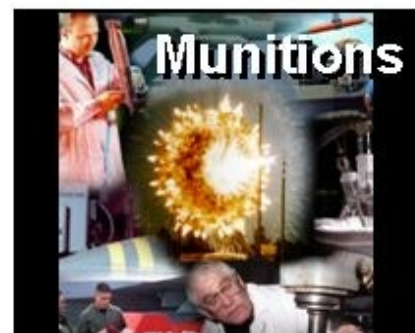
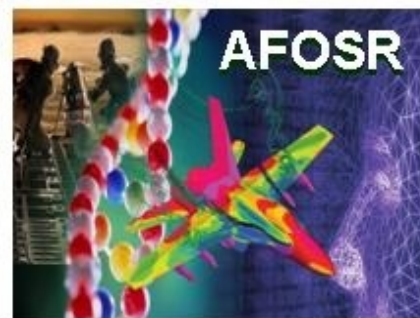
**Air Force Research Laboratory**

***Integrity ★ Service ★ Excellence***

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# Air Force Research Laboratory



*The Air Force's Corporate Research and Development Laboratory*

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# AF Basic Research Manager



**Mission:** *We discover, shape, and champion basic science that profoundly impacts the future Air Force.*

- **Identify Breakthrough Research Opportunities – Here & Abroad**
  - 60 Program Managers interacting with leading scientists and engineers across the globe
  - 3 International offices (London, Tokyo, Santiago)
  - Sponsored 165 scientific workshops and symposiums
- **Foster Revolutionary Basic Research for Air Force Needs**
  - 1291 extramural research grants at 201 U.S. universities
  - 313 intramural research projects at AFRL, USAFA, AFIT
  - 1900 PIs, 3500 grad students, 603 post-docs supported
- **Transition Technologies to DOD and Industry**
  - 907 funded transitions (follow-on-uses) from FY11 PI data call
  - AFRL is the principal transition path
  - 152 STTR small business - university contracts



# AFOSR Reorganization



- Current and previous AFOSR organizations were structured around number of SES positions
  - Not organized to optimize Science Mission, Organized to justify SES positions
  - Organization becomes series of stovepipes and opportunistic engagements
- Current fiscal and scientific environment demands a change
  - Organization must be more collaborative and responsive
  - Scientific Community is changing how they execute research, we need to evolve from current structure

Desired End State: A coherent, collaborative, 6.1 AF organization leading the way to tomorrow's technologies





# Goals of Reorganization

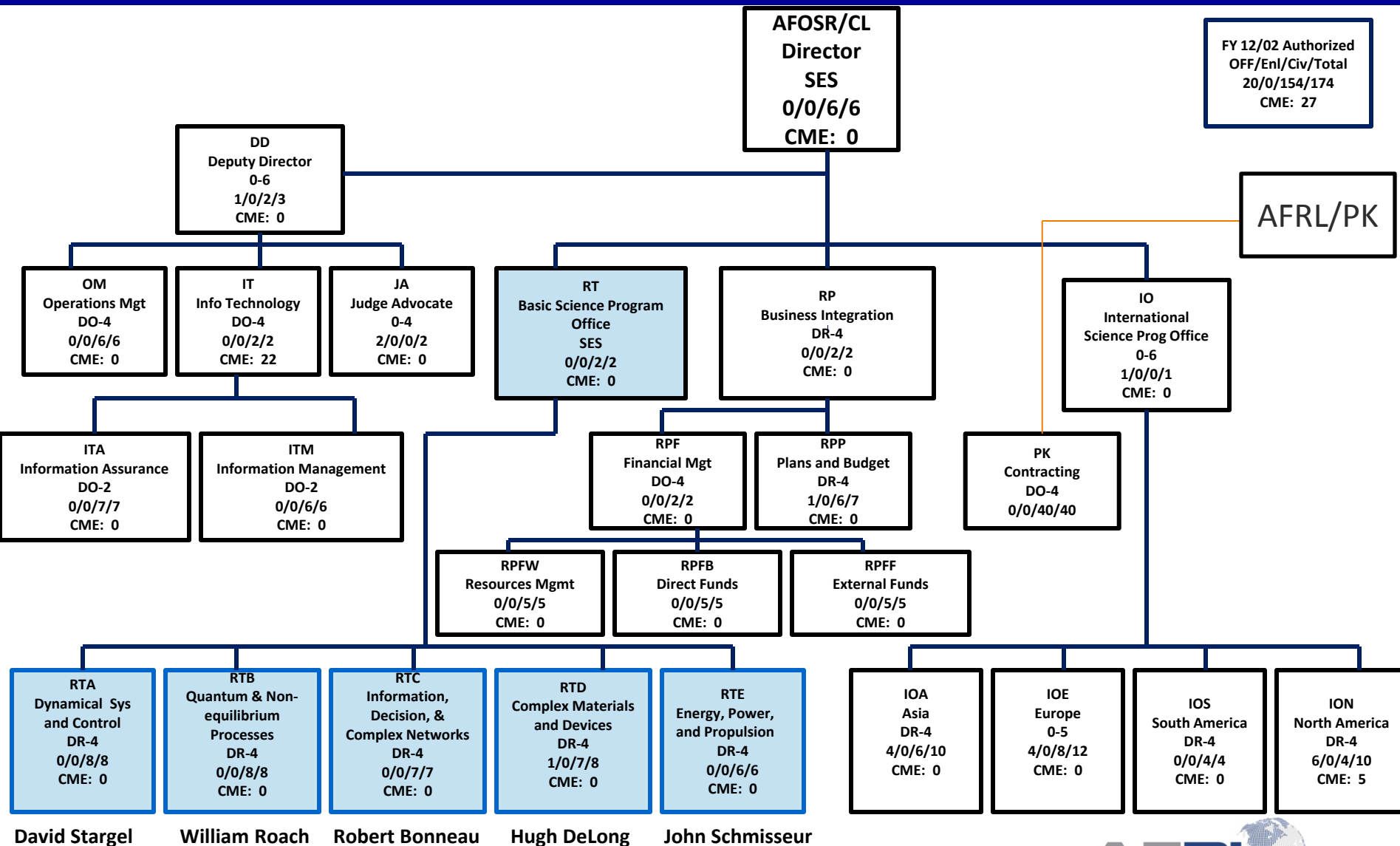


- Maintain strong 6.1 focus and improve scientific quality across AFOSR
  - Maintain semi-autonomy for program managers as subject experts
  - Enhance responsiveness to rapidly changing scientific environment
- Improve the ability to collaborate across all AFOSR portfolios
- Improve the ability to collaborate across the International Enterprise

**Two program manager committees were formed with a focus on RSXs –**



# AFOSR Reorganization

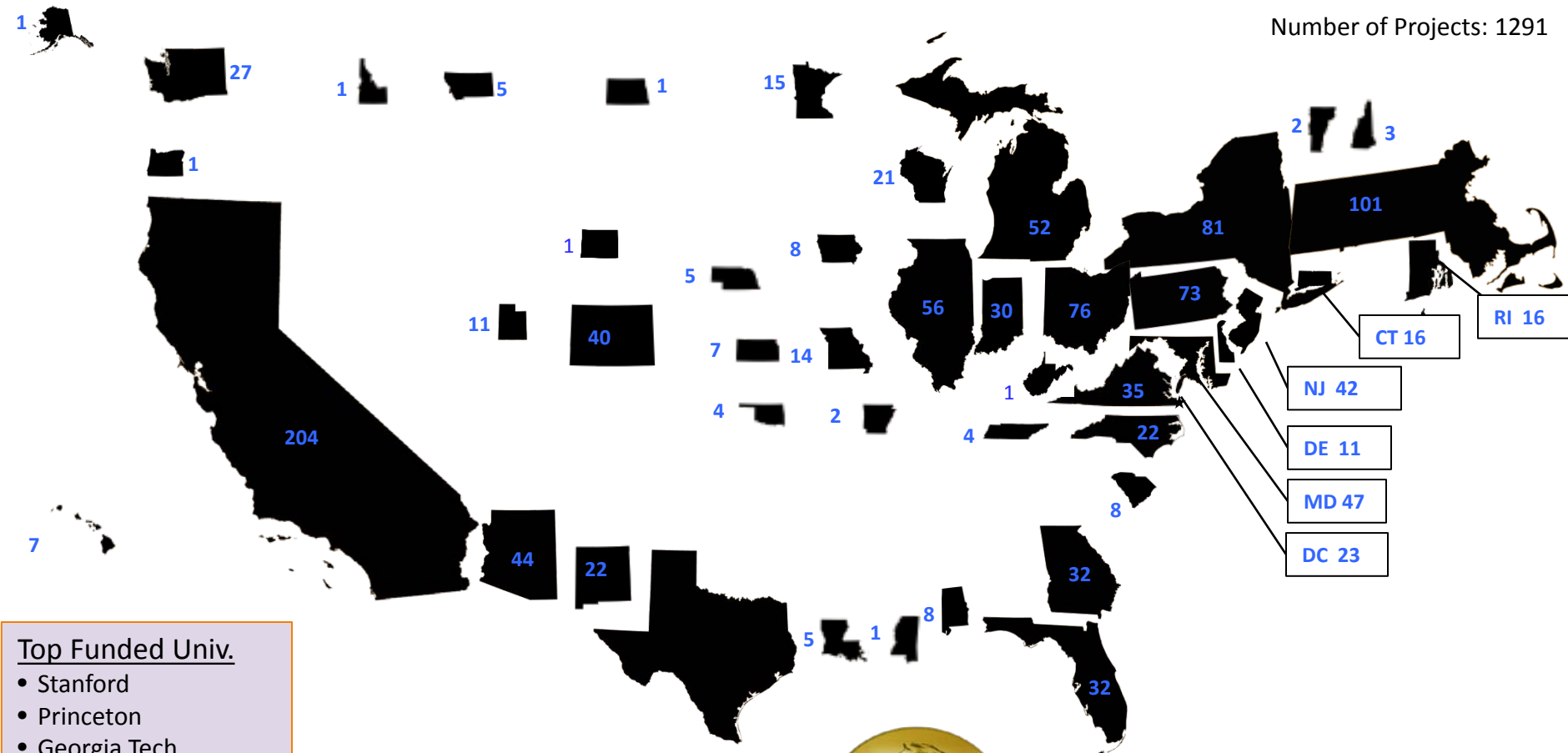




# Broad Academic Engagement Across the US



Number of Projects: 1291



## Top Funded Univ.

- Stanford
- Princeton
- Georgia Tech
- M.I.T.
- UC San Diego
- Univ of Michigan
- UC Berkeley
- Univ. of Maryland
- Univ. of Arizona
- Cal Tech



AFOSR Sponsored 70  
Nobel Laureates

## Current PI Awards & Recognitions:

- 4 - Nobel Prize winners
- 52 - National Academies members
- 2- President's Council (PCAST)
- 24 - Presidential Early Career Award
- 115 - Professional Society Fellows
- 131 - Young Investigator Program

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# Improving the AF Organic Research Capability



## Intramural Proposal Process

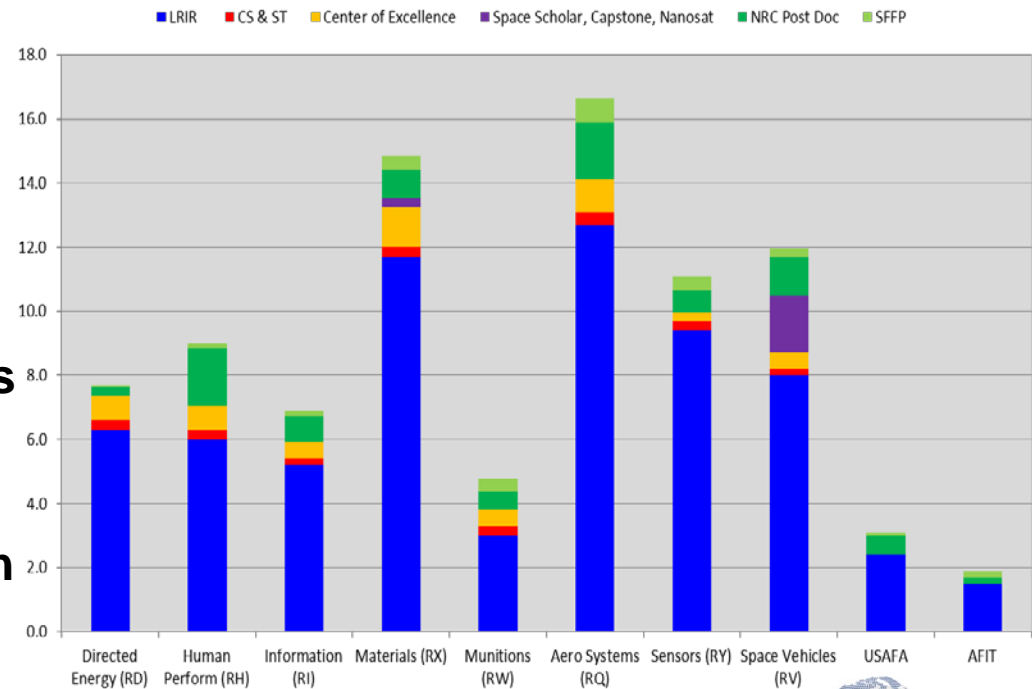
- Best new-start proposals endorsed by AFRL Directors
- Proposals peer reviewed
- 10% of recipients designated as “STAR” teams

**Assures a healthy AF in-house basic research capability**

## Workforce Development

- Centers of Excellence (7 Active/3 Pending)
  - Tie selected universities to TDs
- International personnel exchanges (30)
- Postdocs (80) & summer faculty (99) & students (22) at AF research sites

FY12 In-House Research Funding Data





# Building International Relationship to Avoid Technology Surprise



- *Building international goodwill*
- *Strengthening partnerships*
- *Avoiding technological surprise*
- *Accelerating S&T achievements and transitions to the U.S.*
- Nanomaterials (Taiwan, Korea)
- Metamaterials (Europe, Israel)
- Fiber Lasers (UK)
- Hypersonics (Australia, Brazil, Belgium)
- Machine Cognition (Japan, Australia)
- Brain Science (Korea)
- Extremophiles (Chile)
- Plasma Science (FSU)
- SSA (Chile)
- Bio-Inspired Flight (India, UK)
- Quantum Info Sciences (UK)
- Ultra-Short Pulse Lasers (Europe)

**\$19.7M at International Universities**

***Defense Science Board Report:*** “It is important for DoD to be involved in the cutting edge of basic research on topics of specific interest to the Department—whether the cutting edge is in the U.S. or overseas.”

**Recommendation:** DoD increase the percentage of basic research funding that is invested internationally from 2.5% to 5%

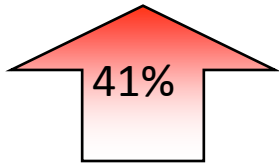
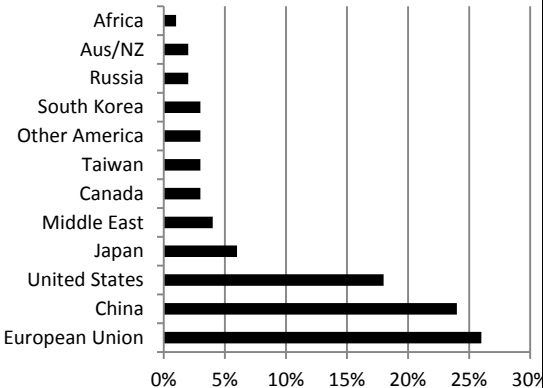


# World R&D Publications (2000 to 2010):

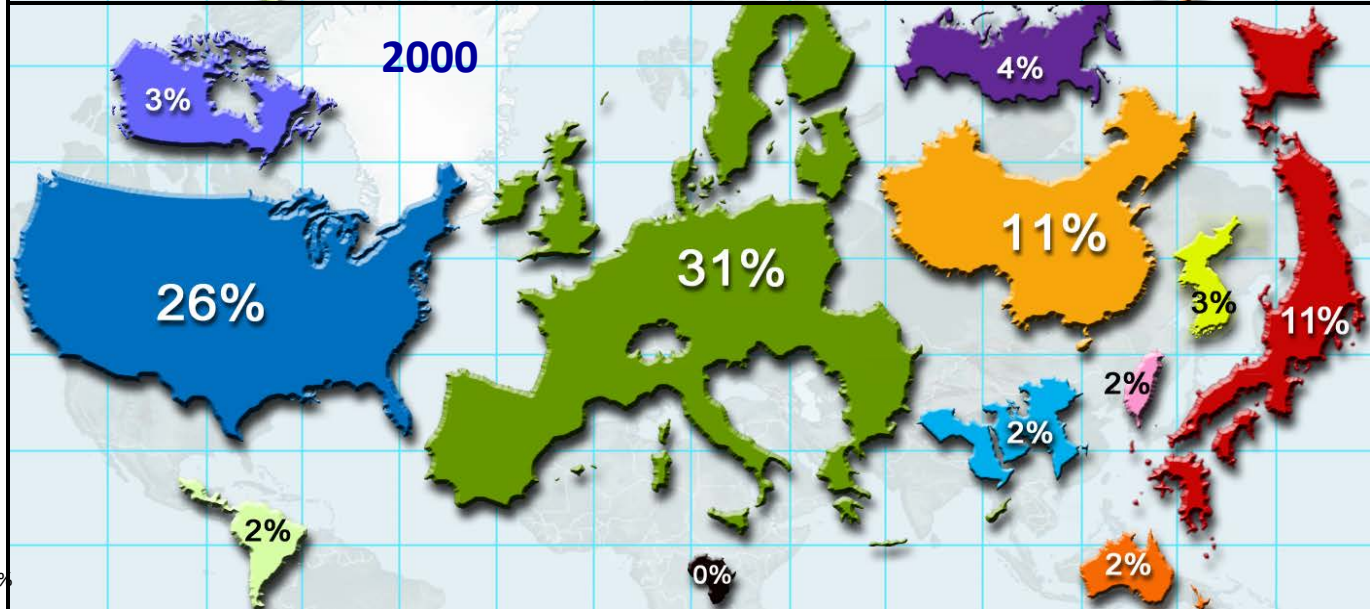
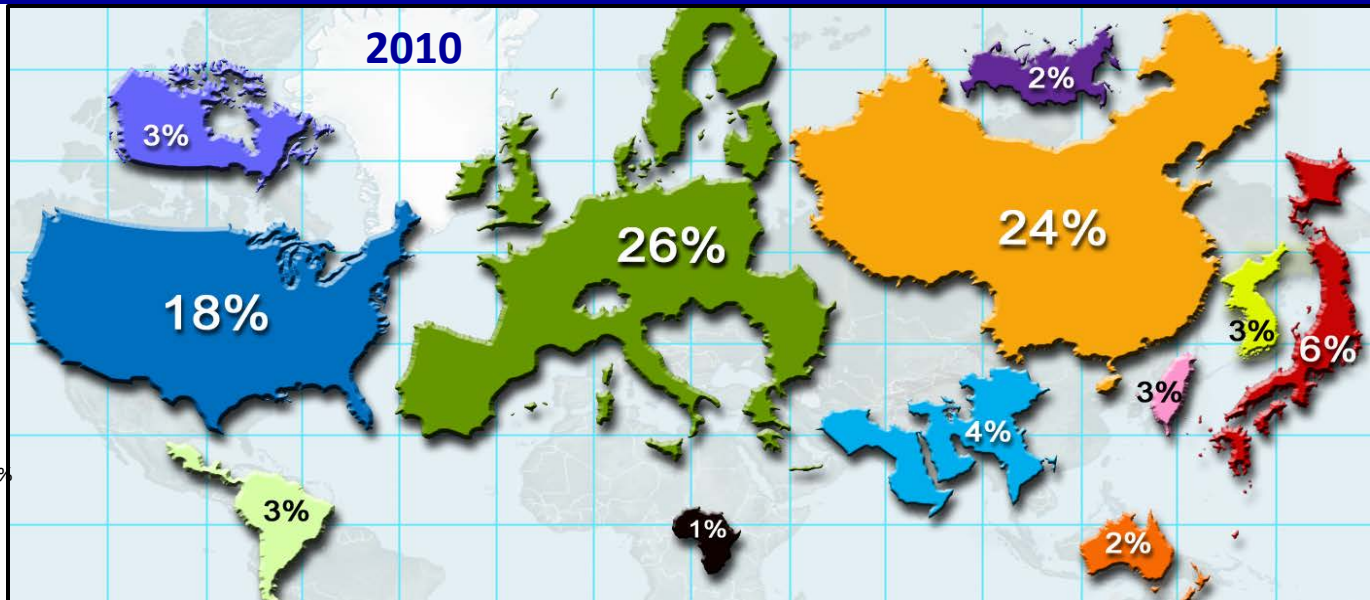
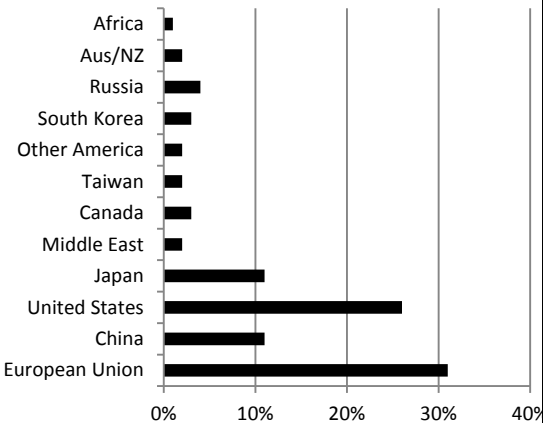
## US share of global R&D steadily decreasing



**2010** 898,416 Articles



**2000** 636,358 Articles







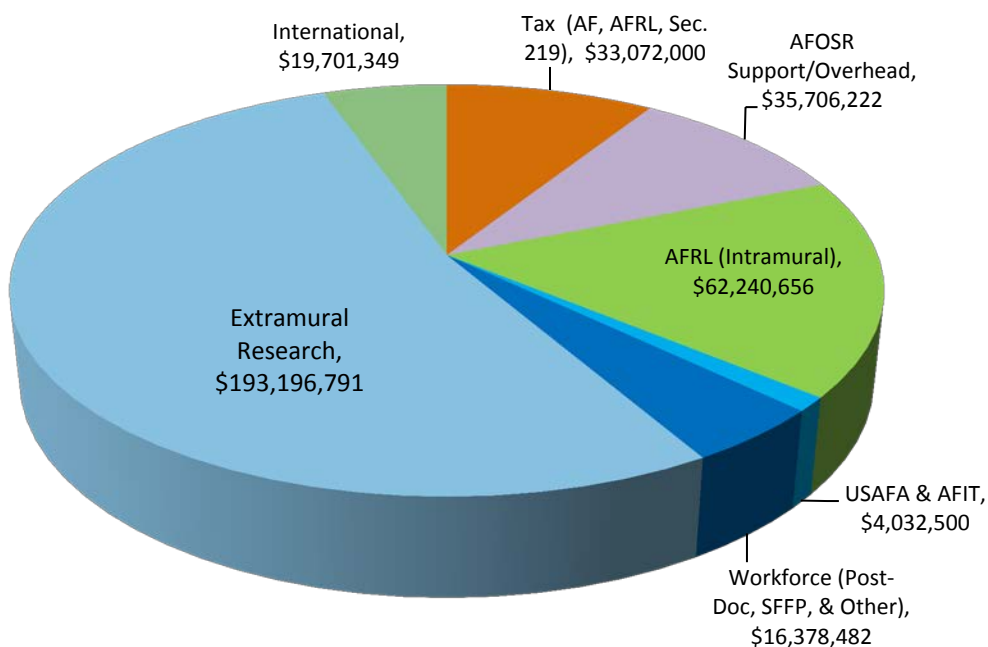
# AF Basic Research Budget



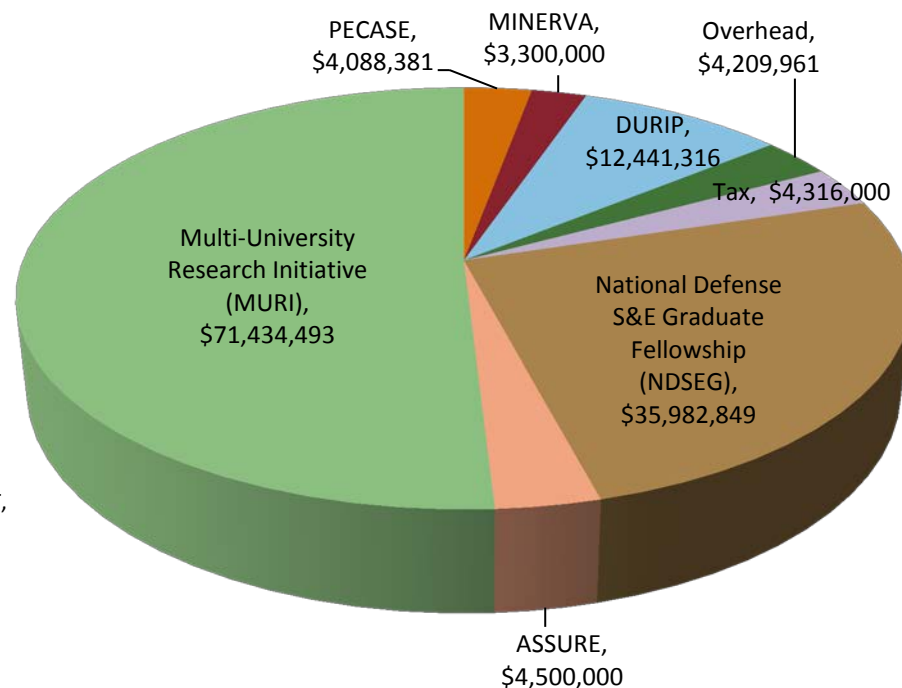
	FY 2012	FY 2013*	FY 2014*	FY 2015*
AF 6.1	364,328	361,787	371,976	379,045
OSD Devolved 6.1	140,273	141,153	138,747	140,738
Total \$K	504,601	502,940	510,723	519,783

\*Estimate

## AF



## OSD





# Educating the Next Generation



- **National Defense Science and Engineering Graduate Fellowship (NDSEG - \$36.0M)**
  - Full tuition assistance + \$31K/per year stipend
  - Fellows do not incur any service obligation
  - Supports over 550 PhD-track graduate students
- **Awards to Stimulate and Support Undergraduate Research Experience (ASSURE - \$4.5M)**
  - Provide undergraduates with research opportunities in S&E fields of DoD interest
  - Supports over 500 undergraduate students during summer months – managed by National Science Foundation
- **Junior Science and Humanities Symposia (JSHS - \$.70M)**
  - Provide high school students to conduct an original research investigation in the STEM field.
- **Professional Society Meetings, Scientific Exchanges, and other Scholar Programs - \$8.89M**
- **Historically Black Colleges & Universities and Minority Institutions (HBCU/MI)**



ASSURE site at Fort Johnson, NY



USA Science & Engineering Festival, DC

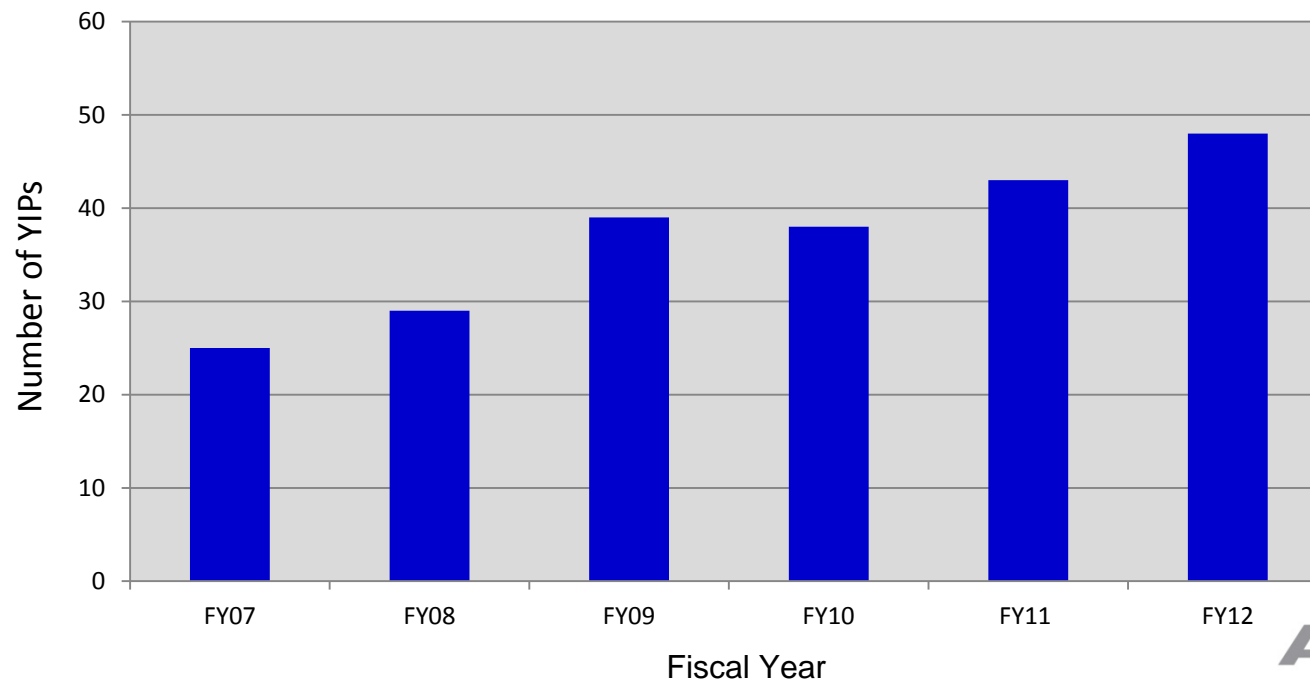




# Young Investigator Program (YIP)



- Develop long-term relationships with leading junior PIs
- 222 awards since FY07; 48 awarded in FY12
- Must have received PhD in the last five years
- Awards up to 5 years
- Goal: increase YIPs to >50/year







# Find AFOSR on Facebook



## **Main AFOSR Page:**

<http://www.facebook.com/afosr>

## **Aerothermodynamics & Turbulence Portfolio:**

<http://www.facebook.com/afosr.GoFast>

## **Flow Interactions & Control Portfolio:**

<http://www.facebook.com/#!/pages/AFOSR-Flow-Interactions-and-Control/>



# Summary



- **The White House and DoD strongly supports the basic research program**
- **AF basic research:**
  - **Probes today's technology limits and ultimately leads to future technologies**
  - **Creates knowledgeable workforce in fields of critical AF interest**
- **AF basic research investments are fully coordinated and leveraging opportunities are exploited for innovation**

"Innovation also demands basic research. Today, the discoveries taking place in our federally-financed labs and universities could lead to ... New lightweight vests for cops and soldiers that can stop any bullet. Don't gut these investments in our budget. Support the same kind of research and innovation that led to the computer chip and the Internet."

- President Obama, State of Union Speech, 24 January 2012





AIR FORCE OFFICE OF SCIENTIFIC RESEARCH 1951 - 2011 AFRL

# Happy 60<sup>th</sup> Birthday

# AFOSR

## 1951 - 2011





# AFOSR Mission



*Discover, shape, and champion basic science that profoundly impacts the future Air Force*

- ID Breakthrough Research Opportunities – Here & Abroad
- Foster Revolutionary Basic Research for Air Force Needs
- Transition Technologies to DoD and Industry

TODAY'S BREAKTHROUGH SCIENCE FOR TOMORROW'S AIR FORCE